

### Powers remote systems for years without refueling

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**Stephan Laistner**

Off-Grid Product Specialist  
at SFC Energy AG

## Summary

- EFOY fuel cells integrate renewable energy and fuel cell technology to power remote systems for years without refueling.
- This new, hybrid system shifts from fuel cells to solar energy to keep systems operating regardless of weather or time of day.
- Morningstar components were selected for the solar charge controllers for their unmatched reliability, advanced technology and competitive pricing.

## Situation

Generating electricity in very remote locations is always a challenge. Whether the application is telecommunications, environmental monitoring and wind measurement, security surveillance or similar, the instruments used require electricity 24/7 but may be miles—sometimes hundreds of miles—away from a viable grid. Because they are often in less accessible locations ranging from mountaintops to ocean platforms, they are beyond the reach of regular fueling and maintenance which rules out the use of generators. Since batteries have limited autonomy they are not a long-term solution, which is why remote power stations often rely on solar panels to augment battery power and keep systems up and running for months or even years in the field.

But some remote locations present difficulties for solar as well. Mountaintops, for example, often experience thick snow cover for much or all of the year, and ocean monitoring platforms are regularly exposed to overcast skies, bird droppings, and other conditions affecting available sunlight.

For these reasons, innovative solution providers are turning to another electrical-generating technology also originally developed for extended space missions: the fuel cell. One such company is SFC in Germany, whose EFOY line integrates both renewable energy and fuel cell technology into field-deployable hybrid energy packages capable of powering remote systems for years without refueling.



## Project

SFC's difference is Direct Methanol Fuel Cell technology, where fuel cells convert methanol from a fuel cartridge directly into electricity, generating only heat, water vapor and a little carbon dioxide as waste by-products. It's the first major advance in this technology since it was developed by NASA a half-century ago to solve a nearly impossible problem: create an electricity source that was lightweight, portable, and capable of performing with 100% reliability in extreme temperatures and corrosive environments for extended periods without maintenance or refueling.

First-generation fuel cells used hydrogen gas, which, while efficient, was difficult to transport and store in bulky tanks, and use on-site safely. SFC's innovative EFOY approach complete energy systems as compact as a mini-fridge and able to operate for years in the field, with refueling accomplished through easy-to-handle methanol cartridges.



## Solution

While a fuel-cell generates electricity, unlike a battery which simply stores it, an energy platform incorporating them still requires balance-of-system electronics. EFOY is now using Morningstar charge controllers for their best-in-class technology and competitive pricing. "[Morningstar's] technology is up to date, where others struggle," observes Stephan Laistner, Off-Grid Product Specialist at SFC Energy AG. "The TriStar offers easy handling, and the no-fan design means fewer parts that can break or struggle." Other product features, including 500W peak power, temperature sensing, and timer controllers, provide options to keep systems running without costly maintenance.



This hybrid system automatically shifts from fuel cells to solar energy to keep systems operating regardless of weather or time of day. Combined with the solar charge controller, this compact system uses both solar and fuel cell electricity sources to charge on-board storage batteries and ensure sufficient power under all operating conditions, with zero downtime.

As the need for security, networking, and data monitoring expands to every corner of the globe, expect to see more of these remarkable hybrid energy systems in the field powering the critical systems on which these applications depend. As these systems reach into increasingly challenging and inhospitable environments, Morningstar components will be there with them to make sure they continue to run with minimum human intervention.